

WHAT IS CLAIMED IS:

1. An improved linear actuator comprising:

5 a direct current (DC) motor having a stator and a rotor, said stator fixed to a reference frame;

10 a threaded shaft coupled to said rotor;

a spring means disposed perpendicular to said axis of said threaded shaft, said spring means comprising a center portion coaxially attached to said threaded shaft and an outer portion attached to said reference frame;

15 a translation actuator threadedly coupled to said threaded shaft, said actuator rotationally stopped and operable to laterally translate in response to rotation of said threaded shaft by said DC motor;

20 a retention clutch; and

an axial collar means of a predetermined length positioned between said threaded shaft and said motor to form a gap area.

- 25 2. The apparatus of claim 1, wherein said spring means stores rotational energy from DC motor when said DC motor rotates said threaded shaft in a first rotary direction, said spring means returning rotational energy to said shaft in a second rotary direction when said DC motor is un-energized;

3. The apparatus of claim 1, wherein said translation actuator further comprises a portion operable to engage a mechanical load.

4. The apparatus of claim 1, wherein said threaded shaft is coaxially coupled to a rotational shaft stop, said shaft stop having a first and second shaft stop surface.

5. The apparatus of claim 1, said linear actuator further comprises a first and a second actuator stop, said first actuator stop contacting said first shaft stop surface in a first translation position and said second actuator stop contacting said second shaft stop surface at a second translation position, wherein a first and second force resulting from said first and second actuator stops contacting said first and second shaft stop surfaces, respectively, act tangential to a radius vector of said threaded shaft.

6. The apparatus of claim 1, where an application of a drive voltage pulse to said DC motor drives said linear actuator in a first direction until said second actuator stop contacts said second shaft stop surface and removing said drive voltage pulse releases said stored rotational energy in said spring means, said stored rotational energy driving said linear actuator in a second direction until said first actuator contacts said first shaft stop surface.

7. An improved linear translating actuator comprising:

a direct current (DC) motor having a stator and a rotor, said stator fixed to a reference frame;

a shaft rotatably coupled to said rotor;

an energy storing means for storing rotational energy from DC motor when said DC motor rotates said shaft in a first rotary direction, said

energy storing means returning rotational energy to said shaft in a second rotary direction when said DC motor is un-energized;

a conversion means for converting rotation motion of said shaft to an actuator lateral translation motion;

a retention clutch;

And an axial collar means of a predetermined length positioned between said threaded shaft and said motor to form a gap area.

8. The apparatus of claim 7, wherein said energy storing means is a torsion spring.

9. The apparatus of claim 7, wherein said shaft is coaxially coupled to a rotational shaft stop, said shaft stop having a first and a second shaft stop surface.

10. The apparatus of claim 9, said linear actuator further comprises a first and a second actuator stop, said first actuator stop contacting said first shaft stop surface in a first translation position and said second actuator stop contacting said second shaft stop surface at a second translation position, wherein a first and second force resulting from said first and second actuator stops contacting said first and second shaft stop surfaces, respectively, act tangential to a radius vector of said threaded shaft

11. The apparatus of claim 10, where an application of a drive voltage pulse to said DC motor drives said linear actuator until said second actuator stop contacts said second shaft stop surface and removing said drive voltage pulse releases said stored rotational energy in said torsion spring, said stored rotational energy driving said linear actuator until said first actuator contacts said first shaft stop surface.

12. The apparatus of claim 7, wherein said energy storage means comprises a torsion spring, wherein a center portion of said torsion spring is coaxially coupled to said shaft and an outer portion of said torsion spring is coupled to said reference frame.

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13. The apparatus of claim 7, wherein said energy storage means comprises a elastic strip having a first and a second end, said elastic strip fixed to said frame at said first end and to said shaft at said second end, said elastic strip wrapping said shaft when said shaft is rotated in said first rotation direction, said elastic strip stretching and thus storing energy.

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14. The apparatus of claim 7, wherein said energy storage means comprises a linear spring having a first end and a second end, said linear spring fixed to said frame at said first end and fixed to a inelastic cord at said second end, said inelastic cord wrapping said shaft when said shaft is rotated in said first rotation direction extending said linear spring, said linear spring elongating thus storing energy.

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15. The apparatus of claim 7, wherein said conversion means comprises a threaded screw member coupled to said shaft and a rotationally retained actuator, said actuator threadedly coupled to said threaded screw member.

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16. The apparatus of claim 7 electromechanically configured to be operative in a POS-type device.

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17. The apparatus of claim 1 electromechanically configured to be operative in a POS-type device.

18. The apparatus of claim 1 operationally configurable for use in an electromechanical drawer-type device.

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19. A kit for a linear translating actuator comprising a set of:

a direct current (DC) motor;

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a shaft for rotatably coupling with said motor;

a spring means for storing rotational energy;

a retention clutch;

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a conversion means for converting rotation motion of said shaft to an actuator
lateral translation motion;

and an axial collar means having a predetermined length.

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20. The kit of claim 19, configured on a linear actuator, wherein said actuator
further comprises a stator and a rotor, said stator fixed to a reference frame; and a
shaft rotatably coupled to said rotor.

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